

SEQUENCE LISTING

<110> Yale University

<120> TREATMENT AND PREVENTION OF CANCER AND PITUITARY  
DISORDERS WITH LATS PROTEINS, DERIVATIVES AND  
FRAGMENTS, AND LATS KNOCK-OUT ANIMAL MODELS

<130> 6523-020-999

<140> 09/763,334

<141> 2001-02-16

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<170> PatentIn Ver. 2.0

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att cct aaa atc aca cac cca aca gat aca tca aat ttt gat cct gtt Ile Pro Lys Ile Thr His Pro Thr Asp Thr Ser Asn Phe Asp Pro Val	1030	1035	1040		3356
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ttc tat gaa ttt acc ttc cga agg ttt ttt gat gac aat ggc tac cca Phe Tyr Glu Phe Thr Phe Arg Arg Phe Phe Asp Asp Asn Gly Tyr Pro	1075	1080	1085	1090	3500
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Glu Ser Val His Lys Met Gly Phe Ile His Arg Asp Ile Lys Pro Asp  
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Pro Pro Pro Ser Trp Glu Pro Ser Ser Gln Thr Lys Arg Tyr Ser Gly			
100	105	110	
aac atg gag tac gta atc tcc cga atc tcc cct gtt cca cct ggg gcg			384
Asn Met Glu Tyr Val Ile Ser Arg Ile Ser Pro Val Pro Pro Gly Ala			
115	120	125	
tgg cag gag ggg tac cct cca cca cct ctt acc act tct ccc atg aat			432
Trp Gln Glu Gly Tyr Pro Pro Pro Leu Thr Thr Ser Pro Met Asn			
130	135	140	
ccc cct agc cag gct cag agg gcc att agt tct gtt cca gtt ggt aga			480
Pro Pro Ser Gln Ala Gln Arg Ala Ile Ser Ser Val Pro Val Gly Arg			
145	150	155	160
caa ccc atc atc atc cag agt act agc aaa ttt aac ttt aca cca ggg			528
Gln Pro Ile Ile Met Gln Ser Thr Ser Lys Phe Asn Phe Thr Pro Gly			
165	170	175	
cga cct gga gtt cag aat ggt ggt ggt cag tct gat ttt atc gtg cac			576
Arg Pro Gly Val Gln Asn Gly Gly Gln Ser Asp Phe Ile Val His			
180	185	190	
caa aat gtc ccc act ggt tct gtg act cgg cag cca cca cct cca tat			624
Gln Asn Val Pro Thr Gly Ser Val Thr Arg Gln Pro Pro Pro Tyr			
195	200	205	
cct ctg acc cca gct aat gga caa agc ccc tct gct tta caa aca ggg			672
Pro Leu Thr Pro Ala Asn Gly Gln Ser Pro Ser Ala Leu Gln Thr Gly			
210	215	220	
gct tct gct gct cca cca tca ttc gcc aat gga aac gtt cct cag tcg			720
Ala Ser Ala Ala Pro Pro Ser Phe Ala Asn Gly Asn Val Pro Gln Ser			
225	230	235	240

atg atg gtg ccc aac agg aac agt cat aac atg gag ctt tat aat att Met Met Val Pro Asn Arg Asn Ser His Asn Met Glu Leu Tyr Asn Ile 245 250 255	768
aat gtc cct gga ctg caa aca gcc tgg ccc cag tcg tct tct gct cct Asn Val Pro Gly Leu Gln Thr Ala Trp Pro Gln Ser Ser Ser Ala Pro 260 265 270	816
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atc aca ccc gct cct att caa cag ccc gtg aaa agc atg cgc gtc ctg Ile Thr Pro Ala Pro Ile Gln Gln Pro Val Lys Ser Met Arg Val Leu 325 330 335	1008
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cca cag cca gtt cag act gtt cag cct acc cct ttt tct gag ggt aca Pro Gln Pro Val Gln Thr Val Gln Pro Thr Pro Phe Ser Glu Gly Thr 355 360 365	1104
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caa ggt cca cca ccg cct tat cca aaa cat ctg cta cac caa aac cca Gln Gly Pro Pro Pro Pro Tyr Pro Lys His Leu Leu His Gln Asn Pro 385 390 395 400	1200
tct gtc cct cca tat gag tca gta agt aag ccc tgc aaa gat gaa cag Ser Val Pro Pro Tyr Glu Ser Val Ser Lys Pro Cys Lys Asp Glu Gln 405 410 415	1248
cct agc tta ccc aag gaa gat gat agt gag aag agt gcg gac agt ggt Pro Ser Leu Pro Lys Glu Asp Asp Ser Glu Lys Ser Ala Asp Ser Gly 420 425 430	1296
gac tct ggg gat aaa gaa aag aaa cag att aca act tca cct atc act Asp Ser Gly Asp Lys Glu Lys Lys Gln Ile Thr Thr Ser Pro Ile Thr 435 440 445	1344
gtt cgaa aac aag aaa gat gaa gaa cga aga gag tct cgg att cag Val Arg Lys Asn Lys Lys Asp Glu Glu Arg Arg Glu Ser Arg Ile Gln 450 455 460	1392

agt tac tcc cca cag gcc ttt aag ttc ttc atg gag cag cac gta gag Ser Tyr Ser Pro Gln Ala Phe Lys Phe Phe Met Glu Gln His Val Glu 465	470	475	480	1440
aac gtc ctg aag tct cat cag cag cgt ctg cat cgg aag aag cag cta Asn Val Leu Lys Ser His Gln Gln Arg Leu His Arg Lys Lys Gln Leu 485	490	495		1488
gaa aat gaa atg atg cgg gtt gga tta tct caa gat gcc cag gat caa Glu Asn Glu Met Met Arg Val Gly Leu Ser Gln Asp Ala Gln Asp Gln 500	505	510		1536
atg aga aag atg ctt tgc cag aaa gag tct aac tat att cgt ctt aaa Met Arg Lys Met Leu Cys Gln Lys Glu Ser Asn Tyr Ile Arg Leu Lys 515	520	525		1584
agg gct aaa atg gac aag tct atg ttt gta aag ata aag aca tta gga Arg Ala Lys Met Asp Lys Ser Met Phe Val Lys Ile Lys Thr Leu Gly 530	535	540		1632
ata gga gcg ttt ggt gaa gtc tgt cta gca aga aaa gtc gat act aaa Ile Gly Ala Phe Gly Glu Val Cys Leu Ala Arg Lys Val Asp Thr Lys 545	550	555	560	1680
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aat cag gtg gct cat gtg aaa gcg gag agg gat atc cta gca gaa gcc Asn Gln Val Ala His Val Lys Ala Glu Arg Asp Ile Leu Ala Glu Ala 580	585	590		1776
gac aat gag tgg gtg gtc cgc ctg tac tac tct ttc cag gac aag gac Asp Asn Glu Trp Val Val Arg Leu Tyr Tyr Ser Phe Gln Asp Lys Asp 595	600	605		1824
aac ttg tac ttt gtg atg gac tac att cct ggg ggg gat atg atg agc Asn Leu Tyr Phe Val Met Asp Tyr Ile Pro Gly Gly Asp Met Met Ser 610	615	620		1872
cta tta att aga atg ggc atc ttt cct gaa aat ctg gca cga ttc tac Leu Leu Ile Arg Met Gly Ile Phe Pro Glu Asn Leu Ala Arg Phe Tyr 625	630	635	640	1920
ata gca gaa ctt acc tgt gca gtt gaa agt gtt cat aaa atg ggt ttt Ile Ala Glu Leu Thr Cys Ala Val Glu Ser Val His Lys Met Gly Phe 645	650	655		1968
att cat aga gat att aaa cct gat aac att ttg att gac cgt gat ggc Ile His Arg Asp Ile Lys Pro Asp Asn Ile Leu Ile Asp Arg Asp Gly 660	665	670		2016
cat att aaa ttg act gac ttt ggc ttg tgc act ggc ttc aga tgg aca His Ile Lys Leu Thr Asp Phe Gly Leu Cys Thr Gly Phe Arg Trp Thr 675	680	685		2064

cat gac tcc aag tac tac cag agt ggg gat cac cca cgg caa gat agc His Asp Ser Lys Tyr Tyr Gln Ser Gly Asp His Pro Arg Gln Asp Ser	2112
690 695 700	
atg gat ttc agt aac gaa tgg gga gat cct tcc aat tgt cgg tgt ggg Met Asp Phe Ser Asn Glu Trp Gly Asp Pro Ser Asn Cys Arg Cys Gly	2160
705 710 715 720	
gac aga ctg aag cca ctg gag cgg aga gct gct cgc cag cac cag cga Asp Arg Leu Lys Pro Leu Glu Arg Arg Ala Ala Arg Gln His Gln Arg	2208
725 730 735	
tgt cta gcc cat tct ctg gtt ggg act ccc aat tat att gca cct gaa Cys Leu Ala His Ser Leu Val Gly Thr Pro Asn Tyr Ile Ala Pro Glu	2256
740 745 750	
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755 760 765	
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770 775 780	
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785 790 795 800	
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805 810 815	
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820 825 830	
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835 840 845	
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850 855 860	
cca aca gat aca tcc aat ttc gac cct gtt gat cct gat aaa ttg tgg Pro Thr Asp Thr Ser Asn Phe Asp Pro Val Asp Pro Asp Lys Leu Trp	2640
865 870 875 880	
agc gat ggc agc gag gag gaa aat atc agt gac act ctg agc gga tgg Ser Asp Gly Ser Glu Glu Asn Ile Ser Asp Thr Leu Ser Gly Trp	2688
885 890 895	
tat aaa aat ggg aag cac ccc gag cac gct ttc tat gag ttc acc ttt Tyr Lys Asn Gly Lys His Pro Glu His Ala Phe Tyr Glu Phe Thr Phe	2736
900 905 910	

cgg agg ttt ttt gat gac aat ggc tac cca tat aat tat cca aag cct		2784	
Arg Arg Phe Phe Asp Asp Asn Gly Tyr Pro Tyr Asn Tyr Pro Lys Pro			
915	920	925	
att gag tat gaa tac att cat tca cag ggc tca gaa caa cag tct gat		2832	
Ile Glu Tyr Glu Tyr Ile His Ser Gln Gly Ser Glu Gln Gln Ser Asp			
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gaa gat gat caa cac aca agc tcc gat gga aac aac cga gat cta gtg		2880	
Glu Asp Asp Gln His Thr Ser Ser Asp Gly Asn Asn Arg Asp Leu Val			
945	950	955	960
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Tyr Arg Ser Glu Ser Pro Asn Ser Gln Ala Asp Val Gly Arg Pro Leu			
35	40	45	
Ser Gly Ser Gly Ile Ala Ala Phe Ala Gln Ala His Pro Ser Asn Gly			
50	55	60	
Gln Arg Val Asn Pro Pro Pro Gln Val Arg Ser Val Thr Pro			
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Pro Pro Pro Pro Arg Gly Gln Thr Pro Pro Pro Arg Gly Thr Thr Pro			
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Pro Pro Pro Ser Trp Glu Pro Ser Ser Gln Thr Lys Arg Tyr Ser Gly			
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Asn Met Glu Tyr Val Ile Ser Arg Ile Ser Pro Val Pro Pro Gly Ala			
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Trp Gln Glu Gly Tyr Pro Pro Pro Pro Leu Thr Thr Ser Pro Met Asn			
130	135	140	

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 Gln Pro Ile Ile Met Gln Ser Thr Ser Lys Phe Asn Phe Thr Pro Gly  
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 Arg Pro Gly Val Gln Asn Gly Gly Gln Ser Asp Phe Ile Val His  
 180 185 190  
 Gln Asn Val Pro Thr Gly Ser Val Thr Arg Gln Pro Pro Pro Pro Tyr  
 195 200 205  
 Pro Leu Thr Pro Ala Asn Gly Gln Ser Pro Ser Ala Leu Gln Thr Gly  
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 Ala Ser Ala Ala Pro Pro Ser Phe Ala Asn Gly Asn Val Pro Gln Ser  
 225 230 235 240  
 Met Met Val Pro Asn Arg Asn Ser His Asn Met Glu Leu Tyr Asn Ile  
 245 250 255  
 Asn Val Pro Gly Leu Gln Thr Ala Trp Pro Gln Ser Ser Ala Pro  
 260 265 270  
 Ala Gln Ser Ser Pro Ser Gly Gly His Glu Ile Pro Thr Trp Gln Pro  
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 Asn Ile Pro Val Arg Ser Asn Ser Phe Asn Asn Pro Leu Gly Ser Arg  
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 Ala Ser His Ser Ala Asn Ser Gln Pro Ser Ala Thr Thr Val Thr Ala  
 305 310 315 320  
 Ile Thr Pro Ala Pro Ile Gln Gln Pro Val Lys Ser Met Arg Val Leu  
 325 330 335  
 Lys Pro Glu Leu Gln Thr Ala Leu Ala Pro Thr His Pro Ser Trp Met  
 340 345 350  
 Pro Gln Pro Val Gln Thr Val Gln Pro Thr Pro Phe Ser Glu Gly Thr  
 355 360 365  
 Ala Ser Ser Val Pro Val Ile Pro Pro Val Ala Glu Ala Pro Ser Tyr  
 370 375 380  
 Gln Gly Pro Pro Pro Pro Tyr Pro Lys His Leu Leu His Gln Asn Pro  
 385 390 395 400  
 Ser Val Pro Pro Tyr Glu Ser Val Ser Lys Pro Cys Lys Asp Glu Gln  
 405 410 415  
 Pro Ser Leu Pro Lys Glu Asp Asp Ser Glu Lys Ser Ala Asp Ser Gly  
 420 425 430  
 Asp Ser Gly Asp Lys Glu Lys Lys Gln Ile Thr Thr Ser Pro Ile Thr  
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Val	Arg	Lys	Asn	Lys	Lys	Asp	Glu	Glu	Arg	Arg	Glu	Ser	Arg	Ile	Gln
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Ser	Tyr	Ser	Pro	Gln	Ala	Phe	Lys	Phe	Phe	Met	Glu	Gln	His	Val	Glu
465						470				475					480
Asn	Val	Leu	Lys	Ser	His	Gln	Gln	Arg	Leu	His	Arg	Lys	Lys	Gln	Leu
						485			490						495
Glu	Asn	Glu	Met	Met	Arg	Val	Gly	Leu	Ser	Gln	Asp	Ala	Gln	Asp	Gln
						500			505						510
Met	Arg	Lys	Met	Leu	Cys	Gln	Lys	Glu	Ser	Asn	Tyr	Ile	Arg	Leu	Lys
						515			520						525
Arg	Ala	Lys	Met	Asp	Lys	Ser	Met	Phe	Val	Lys	Ile	Lys	Thr	Leu	Gly
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Ile	Gly	Ala	Phe	Gly	Glu	Val	Cys	Leu	Ala	Arg	Lys	Val	Asp	Thr	Lys
						545			550						560
Ala	Leu	Tyr	Ala	Thr	Lys	Thr	Leu	Arg	Lys	Lys	Asp	Val	Leu	Leu	Arg
						565			570						575
Asn	Gln	Val	Ala	His	Val	Lys	Ala	Glu	Arg	Asp	Ile	Leu	Ala	Glu	Ala
						580			585						590
Asp	Asn	Glu	Trp	Val	Val	Arg	Leu	Tyr	Tyr	Ser	Phe	Gln	Asp	Lys	Asp
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Asn	Leu	Tyr	Phe	Val	Met	Asp	Tyr	Ile	Pro	Gly	Gly	Asp	Met	Met	Ser
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Leu	Leu	Ile	Arg	Met	Gly	Ile	Phe	Pro	Glu	Asn	Leu	Ala	Arg	Phe	Tyr
						625			630						640
Ile	Ala	Glu	Leu	Thr	Cys	Ala	Val	Glu	Ser	Val	His	Lys	Met	Gly	Phe
						645			650						655
Ile	His	Arg	Asp	Ile	Lys	Pro	Asp	Asn	Ile	Leu	Ile	Asp	Arg	Asp	Gly
						660			665						670
His	Ile	Lys	Leu	Thr	Asp	Phe	Gly	Leu	Cys	Thr	Gly	Phe	Arg	Trp	Thr
						675			680						685
His	Asp	Ser	Lys	Tyr	Tyr	Gln	Ser	Gly	Asp	His	Pro	Arg	Gln	Asp	Ser
						690			695						700
Met	Asp	Phe	Ser	Asn	Glu	Trp	Gly	Asp	Pro	Ser	Asn	Cys	Arg	Cys	Gly
						705			710						720
Asp	Arg	Leu	Lys	Pro	Leu	Glu	Arg	Arg	Ala	Ala	Arg	Gln	His	Gln	Arg
						725			730						735
Cys	Leu	Ala	His	Ser	Leu	Val	Gly	Thr	Pro	Asn	Tyr	Ile	Ala	Pro	Glu
						740			745						750

Val Leu Leu Arg Thr Gly Tyr Thr Gln Leu Cys Asp Trp Trp Ser Val  
 755 760 765  
 Gly Val Ile Leu Cys Glu Met Leu Val Gly Gln Pro Pro Phe Leu Ala  
 770 775 780  
 Gln Thr Pro Leu Glu Thr Gln Met Lys Val Ile Ile Trp Gln Thr Ser  
 785 790 795 800  
 Leu His Ile Pro Pro Gln Ala Lys Leu Ser Pro Glu Ala Ser Asp Leu  
 805 810 815  
 Ile Ile Lys Leu Cys Arg Gly Pro Glu Asp Arg Leu Gly Lys Asn Gly  
 820 825 830  
 Ala Asp Glu Ile Lys Ala His Pro Phe Phe Lys Thr Ile Asp Phe Ser  
 835 840 845  
 Ser Asp Leu Arg Gln Gln Ser Ala Ser Tyr Ile Pro Lys Ile Thr His  
 850 855 860  
 Pro Thr Asp Thr Ser Asn Phe Asp Pro Val Asp Pro Asp Lys Leu Trp  
 865 870 875 880  
 Ser Asp Gly Ser Glu Glu Glu Asn Ile Ser Asp Thr Leu Ser Gly Trp  
 885 890 895  
 Tyr Lys Asn Gly Lys His Pro Glu His Ala Phe Tyr Glu Phe Thr Phe  
 900 905 910  
 Arg Arg Phe Phe Asp Asp Asn Gly Tyr Pro Tyr Asn Tyr Pro Lys Pro  
 915 920 925  
 Ile Glu Tyr Glu Tyr Ile His Ser Gln Gly Ser Glu Gln Gln Ser Asp  
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35 40 45	
tgt gac cag gag atg gct ggc aga gcg ctc acg cag acg ggc agt agg Cys Asp Gln Glu Met Ala Gly Arg Ala Leu Thr Gln Thr Gly Ser Arg	192
50 55 60	
agt atc gaa gct gcc ttg gag tac atc agt aag atg ggc tac ctg gac Ser Ile Glu Ala Ala Leu Glu Tyr Ile Ser Lys Met Gly Tyr Leu Asp	240
65 70 75 80	
ccc agg aat gag cag att gtg cga gtc atc aag cag acc tcc cca gga Pro Arg Asn Glu Gln Ile Val Arg Val Ile Lys Gln Thr Ser Pro Gly	288
85 90 95	
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100 105 110	
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115 120 125	
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130 135 140	
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145 150 155 160	
cat cct ccc aaa ggg tac agc aca gca gta gag cca agt gcg cac ttt His Pro Pro Lys Gly Tyr Ser Thr Ala Val Glu Pro Ser Ala His Phe	528
165 170 175	
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180 185 190	
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210 215 220	
acc ttt cct gcc cat gct ggg ctg tac act gcc tcg cac cac aag ccg Thr Phe Pro Ala His Ala Gly Leu Tyr Thr Ala Ser His His Lys Pro	720
225 230 235 240	

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ggt ccc acg ttt act ggc gaa agc tct gca cag gct gtg ctg gca ccg Gly Pro Thr Phe Thr Gly Glu Ser Ser Ala Gln Ala Val Leu Ala Pro 260	265	270	816	
tcc agg aac agc ctc aat gct gac ttg tac gag ctg ggc tcc acg gtg Ser Arg Asn Ser Leu Asn Ala Asp Leu Tyr Glu Leu Gly Ser Thr Val 275	280	285	864	
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ccc aac acg gtc acc gcc gtg acg gcc gca cac atc ctt cac cct gtg Pro Asn Thr Val Thr Ala Val Thr Ala Ala His Ile Leu His Pro Val 340	345	350	1056	
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tcg cac ccc gcc tgg gtg gct gcg ccc aca gca cct gcc act gag agc Ser His Pro Ala Trp Val Ala Ala Pro Thr Ala Pro Ala Thr Glu Ser 370	375	380	1152	
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ggg agt gac aag agc cac aaa ggt gcg aag gga gac aaa gct ggc aga Gly Ser Asp Lys Ser His Lys Gly Ala Lys Gly Asp Lys Ala Gly Arg 450	455	460	1392	

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Ile Leu Ile Asp Arg Asp Gly His Ile Lys Leu Thr Asp Phe Gly Leu	
845 850 855	
tgc acg gga ttc cga tgg acg cac aac tcg aag tac tac cag gag aac	3724
Cys Thr Gly Phe Arg Trp Thr His Asn Ser Lys Tyr Tyr Gln Glu Asn	
860 865 870	
ggc aat cac tcg cgc cag gac tcg atg gag ccc tgg gag gaa tac tcc	3772
Gly Asn His Ser Arg Gln Asp Ser Met Glu Pro Trp Glu Glu Tyr Ser	
875 880 885 890	
gag aac gga ccg aag ccc acc gtc ctg gag agg cga cgg atg cgc gat	3820
Glu Asn Gly Pro Lys Pro Thr Val Leu Glu Arg Arg Arg Met Arg Asp	
895 900 905	
cac caa aga gtc ctg gcc cac tcg ctg gtc ggc acc ccg aac tac ata	3868
His Gln Arg Val Leu Ala His Ser Leu Val Gly Thr Pro Asn Tyr Ile	
910 915 920	
gct ccc gag gtg ctg gag agr agt ggg tac acg cag ctg tgc gac tac	3916
Ala Pro Glu Val Leu Glu Arg Ser Gly Tyr Thr Gln Leu Cys Asp Tyr	
925 930 935	
tgg agc gtg ggc gtc atc cty tay gag atg ctg gtg ggt cag ccg ccc	3964
Trp Ser Val Gly Val Ile Leu Tyr Glu Met Leu Val Gly Gln Pro Pro	
940 945 950	
ttt ctg gcc aac agt ccg ctg gaa acg caa caa aag gtc atc aac tgg	4012
Phe Leu Ala Asn Ser Pro Leu Glu Thr Gln Gln Lys Val Ile Asn Trp	
955 960 965 970	
gag aaa acs ctg cat att ccg ccg cag gcc gag tta tcc cgc gag gct	4060
Glu Lys Thr Leu His Ile Pro Pro Gln Ala Glu Leu Ser Arg Glu Ala	
975 980 985	
acg gac ttg ata agg agg ctc tgt gcg tcg gct gac aag cgg ctg ggc	4108
Thr Asp Leu Ile Arg Arg Leu Cys Ala Ser Ala Asp Lys Arg Leu Gly	
990 995 1000	

aag	agc	gtg	gac	gag	gtc	aag	agc	cac	gac	ttc	ttc	aag	ggc	atc	4153
Lys	Ser	Val	Asp	Glu	Val	Lys	Ser	His	Asp	Phe	Phe	Lys	Gly	Ile	
1005						1010						1015			
gac	ttt	gcg	gac	atg	cg	aag	cag	aaa	gcg	ccc	tac	ata	ccg	gaa	4198
Asp	Phe	Ala	Asp	Met	Arg	Lys	Gln	Lys	Ala	Pro	Tyr	Ile	Pro	Glu	
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atc	aag	cac	ccr	acg	gac	aca	tcc	aac	ttt	gat	ccc	gtg	gat	ccg	4243
Ile	Lys	His	Pro	Thr	Asp	Thr	Ser	Asn	Phe	Asp	Pro	Val	Asp	Pro	
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gag	aag	ctg	cgc	tcg	aat	gac	tcc	acc	atg	agc	agc	ggc	gat	gat	4288
Glu	Lys	Leu	Arg	Ser	Asn	Asp	Ser	Thr	Met	Ser	Ser	Gly	Asp	Asp	
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gtc	gac	cag	aat	gac	cgc	acy	ttc	cac	ggc	ttt	ttc	gaa	ttt	acc	4333
Val	Asp	Gln	Asn	Asp	Arg	Thr	Phe	His	Gly	Phe	Phe	Glu	Phe	Thr	
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ttc	cgt	cgc	ttc	ttc	gac	gac	aag	cag	ccg	ccg	gat	atg	acg	gac	4378
Phe	Arg	Arg	Phe	Phe	Asp	Asp	Lys	Gln	Pro	Pro	Asp	Met	Thr	Asp	
1080						1085						1090			
gat	cag	gcf	ccg	gtt	tac	gtc	tgaaatggat	gctctccatg	tgcccaacac						4429
Asp	Gln	Ala	Pro	Val	Tyr	Val									
1095															
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tgagtggct	tgcattgtaa	aggaagcgtg	gctatagaat	gaaactatct	atatacatta										4549
tataaattat	aggagacagt	agaggcggga	gctacgtata	tacatacataa	taatatacat										4609
atatttgcata	tatataata	tatataatgc	gtagggcatg	aactgaataa	atataaaaacg										4669
gagccgagta	gagatgaaac	gagaggagcg	agtcaggacc	ttcgacctt	aactgaacat										4729
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aaaaaaaaaca	gaaacagtac	gagaaaattg	taatctt	aatgtat	tgtaaagaa										5389
acgttaattg	taatctatgc	taggttg	tagcccc	agatgttt	tagttatag										5449
accgctaacc	gtaatctgt	ttaattc	acactaagcg	agagtac	acattgg										5509
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atattcgtgg	atggagccta	ttttaaatgt	gagatcg	taattgaagg	aaatacaaa										5689
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<212> PRT  
<213> Drosophila melanogaster

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<223> Xaa = Lys, Ser

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 Val Gln Asn Asn His Arg Asn Asn Gln Asn Tyr Thr Pro Leu Arg Tyr  
 35 40 45  
  
 Thr Ala Thr Asn Gly Arg Asn Asp Ala Leu Thr Pro Asp Tyr His His  
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 Ala Lys Gln Pro Met Glu Pro Pro Ser Ala Ser Pro Ala Pro Asp  
 65 70 75 80  
  
 Val Val Ile Pro Pro Pro Ala Ile Val Gly Gln Pro Gly Ala Gly  
 85 90 95  
  
 Ser Ile Ser Val Ser Gly Val Gly Val Gly Val Val Gly Val Ala Asn  
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 Gly Arg Val Pro Lys Met Met Thr Ala Leu Met Pro Asn Lys Leu Ile  
 115 120 125  
  
 Arg Lys Pro Ser Ile Glu Arg Asp Thr Ala Ser Ser His Tyr Leu Arg  
 130 135 140  
  
 Cys Ser Pro Ala Leu Asp Ser Gly Ala Gly Ser Ser Arg Ser Asp Ser  
 145 150 155 160  
  
 Pro His Ser His His Thr His Gln Pro Ser Ser Arg Thr Val Gly Asn  
 165 170 175  
  
 Pro Gly Gly Asn Gly Gly Phe Ser Pro Ser Pro Ser Gly Phe Ser Glu  
 180 185 190  
  
 Val Ala Pro Pro Ala Pro Pro Pro Arg Asn Pro Thr Ala Xaa Ser Ala  
 195 200 205  
  
 Ala Thr Pro Pro Pro Pro Val Pro Pro Thr Ser Gln Ala Tyr Val Lys  
 210 215 220  
  
 Arg Arg Ser Pro Ala Leu Asn Asn Arg Pro Pro Ala Ile Ala Pro Pro  
 225 230 235 240  
  
 Thr Gln Arg Gly Asn Ser Pro Val Ile Thr Gln Asn Gly Leu Lys Asn  
 245 250 255  
  
 Pro Gln Gln Gln Leu Thr Gln Gln Leu Lys Ser Leu Asn Leu Tyr Pro  
 260 265 270  
  
 Gly Gly Gly Ser Gly Ala Val Val Glu Pro Pro Pro Pro Tyr Leu Ile  
 275 280 285  
  
 Gln Gly Gly Ala Gly Gly Ala Ala Pro Pro Pro Pro Pro Pro Ser Tyr  
 290 295 300

Thr Ala Ser Met Gln Ser Arg Gln Ser Pro Thr Gln Ser Gln Gln Ser  
 305 310 315 320  
 Asp Tyr Arg Lys Ser Pro Ser Ser Gly Ile Tyr Ser Ala Thr Ser Ala  
 325 330 335  
 Gly Ser Pro Ser Pro Ile Thr Val Ser Leu Pro Pro Ala Pro Leu Ala  
 340 345 350  
 Lys Pro Gln Pro Arg Val Tyr Gln Ala Arg Ser Gln Gln Pro Ile Ile  
 355 360 365  
 Met Gln Ser Val Lys Ser Thr Gln Val Gln Lys Pro Val Leu Gln Thr  
 370 375 380  
 Ala Val Ala Arg Gln Ser Pro Ser Ser Ala Ser Ala Ser Asn Ser Pro  
 385 390 395 400  
 Val His Val Leu Ala Ala Pro Pro Ser Tyr Pro Gln Lys Ser Ala Ala  
 405 410 415  
 Val Val Gln Gln Gln Gln Ala Ala Ala Ala His Gln Gln Gln  
 420 425 430  
 His Gln His Gln Gln Ser Lys Pro Pro Thr Pro Thr Thr Pro Pro Leu  
 435 440 445  
 Val Gly Leu Asn Ser Lys Pro Asn Cys Leu Glu Pro Pro Ser Tyr Ala  
 450 455 460  
 Lys Ser Met Gln Ala Lys Ala Ala Thr Val Val Xaa Gln Gln Gln Gln  
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 Gln Gln Gln Gln Gln Val Gln Gln Gln Val Gln Gln Gln Gln  
 485 490 495  
 Gln Gln Gln Gln Gln Leu Gln Ala Leu Arg Val Leu Gln Ala Gln  
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 Ala Gln Arg Glu Arg Asp Gln Arg Glu Arg Glu Arg Asp Gln Gln Lys  
 515 520 525  
 Leu Ala Asn Gly Asn Pro Gly Arg Gln Met Leu Pro Pro Pro Pro Tyr  
 530 535 540  
 Gln Ser Asn Asn Asn Asn Ser Glu Ile Lys Pro Pro Ser Cys Asn  
 545 550 555 560  
 Asn Asn Asn Ile Gln Ile Ser Asn Ser Asn Leu Ala Thr Thr Pro Pro  
 565 570 575  
 Ile Pro Pro Ala Lys Tyr Asn Asn Ser Ser Asn Thr Gly Ala Asn  
 580 585 590  
 Ser Ser Gly Gly Ser Asn Gly Ser Thr Gly Thr Thr Ala Ser Ser Ser  
 595 600 605

Thr Ser Cys Lys Lys Ile Lys His Ala Ser Pro Ile Pro Glu Arg Lys  
 610 615 620  
 Lys Ile Ser Lys Glu Lys Glu Glu Glu Arg Lys Glu Phe Arg Ile Arg  
 625 630 635 640  
 Gln Tyr Ser Pro Gln Ala Phe Lys Phe Met Glu Gln His Ile Glu  
 645 650 655  
 Asn Val Ile Lys Ser Tyr Arg Gln Arg Thr Tyr Arg Lys Asn Gln Leu  
 660 665 670  
 Glu Lys Glu Met His Lys Val Gly Leu Pro Asp Gln Thr Gln Ile Glu  
 675 680 685  
 Met Arg Lys Met Leu Asn Gln Lys Glu Ser Asn Tyr Ile Arg Leu Lys  
 690 695 700  
 Arg Ala Lys Met Asp Lys Ser Met Phe Val Lys Leu Lys Pro Ile Gly  
 705 710 715 720  
 Val Gly Ala Phe Gly Glu Val Thr Leu Val Ser Lys Ile Asp Thr Ser  
 725 730 735  
 Asn His Leu Tyr Ala Met Lys Thr Leu Arg Lys Ala Asp Val Leu Lys  
 740 745 750  
 Arg Asn Gln Val Ala His Val Lys Ala Glu Arg Asp Ile Leu Ala Glu  
 755 760 765  
 Ala Asp Asn Asn Trp Val Val Lys Leu Tyr Tyr Ser Phe Gln Asp Lys  
 770 775 780  
 Asp Asn Leu Tyr Phe Val Met Asp Tyr Ile Pro Gly Gly Asp Leu Met  
 785 790 795 800  
 Ser Leu Leu Ile Lys Leu Gly Ile Phe Glu Glu Glu Leu Ala Arg Phe  
 805 810 815  
 Tyr Ile Ala Glu Val Thr Cys Ala Val Asp Ser Val His Lys Met Gly  
 820 825 830  
 Phe Ile His Arg Asp Ile Lys Pro Asp Asn Ile Leu Ile Asp Arg Asp  
 835 840 845  
 Gly His Ile Lys Leu Thr Asp Phe Gly Leu Cys Thr Gly Phe Arg Trp  
 850 855 860  
 Thr His Asn Ser Lys Tyr Tyr Gln Glu Asn Gly Asn His Ser Arg Gln  
 865 870 875 880  
 Asp Ser Met Glu Pro Trp Glu Glu Tyr Ser Glu Asn Gly Pro Lys Pro  
 885 890 895  
 Thr Val Leu Glu Arg Arg Met Arg Asp His Gln Arg Val Leu Ala  
 900 905 910

His Ser Leu Val Gly Thr Pro Asn Tyr Ile Ala Pro Glu Val Leu Glu  
 915 920 925  
 Arg Ser Gly Tyr Thr Gln Leu Cys Asp Tyr Trp Ser Val Gly Val Ile  
 930 935 940  
 Xaa Tyr Glu Met Leu Val Gly Gln Pro Pro Phe Leu Ala Asn Ser Pro  
 945 950 955 960  
 Leu Glu Thr Gln Gln Lys Val Ile Asn Trp Glu Lys Thr Leu His Ile  
 965 970 975  
 Pro Pro Gln Ala Glu Leu Ser Arg Glu Ala Thr Asp Leu Ile Arg Arg  
 980 985 990  
 Leu Cys Ala Ser Ala Asp Lys Arg Leu Gly Lys Ser Val Asp Glu Val  
 995 1000 1005  
 Lys Ser His Asp Phe Phe Lys Gly Ile Asp Phe Ala Asp Met Arg  
 1010 1015 1020  
 Lys Gln Lys Ala Pro Tyr Ile Pro Glu Ile Lys His Pro Thr Asp  
 1025 1030 1035  
 Thr Ser Asn Phe Asp Pro Val Asp Pro Glu Lys Leu Arg Ser Asn  
 1040 1045 1050  
 Asp Ser Thr Met Ser Ser Gly Asp Asp Val Asp Gln Asn Asp Arg  
 1055 1060 1065  
 Thr Phe His Gly Phe Phe Glu Phe Thr Phe Arg Arg Phe Phe Asp  
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Val

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 <212> PRT  
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 Val Tyr Arg Ser Glu Ser Pro Asn Ser Gln Ala Asp Val Gly Arg Pro  
 35 40 45  
 Leu Ser Gly Ser Gly Ile Ala Ala Phe Ala Gln Ala His Pro Ser Asn  
 50 55 60  
 Gly Gln Arg Val Asn Pro Pro Pro Pro Gln Val Arg Ser Val Thr  
 65 70 75 80  
 Pro Pro Pro Pro Arg Gly Gln Thr Pro Pro Pro Arg Gly Thr Thr  
 85 90 95

Pro Pro Pro Pro Ser Trp Glu Pro Ser Ser Gln Thr Lys Arg Tyr Ser  
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 Gly Asn Met Glu Tyr Val Ile Ser Arg Ile Ser Pro Val Pro Pro Gly  
           115                 120                 125  
 Ala Trp Gln Glu Gly Tyr Pro Pro Pro Pro Leu Thr Thr Ser Pro Met  
           130                 135                 140  
 Asn Pro Pro Ser Gln Ala Gln Arg Ala Ile Ser Ser Val Pro Val Gly  
           145                 150                 155                 160  
 Arg Gln Pro Ile Ile Met Gln Ser Thr Ser Lys Phe Asn Phe Thr Pro  
           165                 170                 175  
 Gly Arg Pro Gly Val Gln Asn Gly Gly Gln Ser Asp Phe Ile Val  
           180                 185                 190  
 His Gln Asn Val Pro Thr Gly Ser Val Thr Arg Gln Pro Pro Pro Pro  
           195                 200                 205  
 Tyr Pro Leu Thr Pro Ala Asn Gly Gln Ser Pro Ser Ala Leu Gln Thr  
           210                 215                 220  
 Gly Ala Ser Ala Ala Pro Pro Ser Phe Ala Asn Gly Asn Val Pro Gln  
           225                 230                 235                 240  
 Ser Met Met Val Pro Asn Arg Asn Ser His Asn Met Glu Leu Tyr Asn  
           245                 250                 255  
 Ile Asn Val Pro Gly Leu Gln Thr Ala Trp Pro Gln Ser Ser Ser Ala  
           260                 265                 270  
 Pro Ala Gln Ser Ser Pro Ser Gly Gly His Glu Ile Pro Thr Trp Gln  
           275                 280                 285  
 Pro Asn Ile Pro Val Arg Ser Asn Ser Phe Asn Asn Pro Leu Gly Ser  
           290                 295                 300  
 Arg Ala Ser His Ser Ala Asn Ser Gln Pro Ser Ala Thr Thr Val Thr  
           305                 310                 315                 320  
 Ala Ile Thr Pro Ala Pro Ile Gln Gln Pro Val Lys Ser Met Arg Val  
           325                 330                 335  
 Leu Lys Pro Glu Leu Gln Thr Ala Leu Ala Pro Thr His Pro Ser Trp  
           340                 345                 350  
 Met Pro Gln Pro Val Gln Thr Val Gln Pro Thr Pro Phe Ser Glu Gly  
           355                 360                 365  
 Thr Ala Ser Ser Val Pro Val Ile Pro Pro Val Ala Glu Ala Pro Ser  
           370                 375                 380  
 Tyr Gln Gly Pro Pro Pro Pro Tyr Pro Lys His Leu Leu His Gln Asn  
           385                 390                 395                 400  
 Pro Ser Val Pro Pro Tyr Glu Ser Val Ser Lys Pro Cys Lys Asp Glu  
           405                 410                 415  
 Gln Pro Ser Leu Pro Lys Glu Asp Asp Ser Glu Lys Ser Ala Asp Ser  
           420                 425                 430  
 Gly Asp Ser Gly Asp Lys Glu Lys Lys Gln Ile Thr Thr Ser Pro Ile  
           435                 440                 445  
 Thr Val Arg Lys Asn Lys Lys Asp Glu Glu Arg Arg Glu Ser Arg Ile  
           450                 455                 460  
 Gln Ser Tyr Ser Pro Gln Ala Phe Lys Phe Phe Met Glu Gln His Val  
           465                 470                 475                 480  
 Glu Asn Val Leu Lys Ser His Gln Gln Arg Leu His Arg Lys Lys Gln  
           485                 490                 495  
 Leu Glu Asn Glu Met Met Arg Val Gly Leu Ser Gln Asp Ala Gln Asp  
           500                 505                 510  
 Gln Met Arg Lys Met Leu Cys Gln Lys Glu Ser Asn Tyr Ile Arg Leu  
           515                 520                 525  
 Lys Arg Ala Lys Met Asp Lys Ser Met Phe Val Lys Ile Lys Thr Leu  
           530                 535                 540  
 Gly Ile Gly Ala Phe Gly Glu Val Cys Leu Ala Arg Lys Val Asp Thr  
           545                 550                 555                 560

Lys Ala Leu Tyr Ala Thr Lys Thr Leu Arg Lys Lys Asp Val Leu Leu  
                   565                  570                  575  
 Arg Asn Gln Val Ala His Val Lys Ala Glu Arg Asp Ile Leu Ala Glu  
                   580                  585                  590  
 Ala Asp Asn Glu Trp Val Val Arg Leu Tyr Tyr Ser Phe Gln Asp Lys  
                   595                  600                  605  
 Asp Asn Leu Tyr Phe Val Met Asp Tyr Ile Pro Gly Gly Asp Met Met  
                   610                  615                  620  
 Ser Leu Leu Ile Arg Met Gly Ile Phe Pro Glu Asn Leu Ala Arg Phe  
                   625                  630                  635                  640  
 Tyr Ile Ala Glu Leu Thr Cys Ala Val Glu Ser Val His Lys Met Gly  
                   645                  650                  655  
 Phe Ile His Arg Asp Ile Lys Pro Asp Asn Ile Leu Ile Asp Arg Asp  
                   660                  665                  670  
 Gly His Ile Lys Leu Thr Asp Phe Gly Leu Cys Thr Gly Phe Arg Trp  
                   675                  680                  685  
 Thr His Asp Ser Lys Tyr Tyr Gln Ser Gly Asp His Pro Arg Gln Asp  
                   690                  695                  700  
 Ser Met Asp Phe Ser Asn Glu Trp Gly Asp Pro Ser Asn Cys Arg Cys  
                   705                  710                  715                  720  
 Gly Asp Arg Leu Lys Pro Leu Glu Arg Arg Ala Ala Arg Gln His Gln  
                   725                  730                  735  
 Arg Cys Leu Ala His Ser Leu Val Gly Thr Pro Asn Tyr Ile Ala Pro  
                   740                  745                  750  
 Glu Val Leu Leu Arg Thr Gly Tyr Thr Gln Leu Cys Asp Trp Trp Ser  
                   755                  760                  765  
 Val Gly Val Ile Leu Cys Glu Met Leu Val Gly Gln Pro Pro Phe Leu  
                   770                  775                  780  
 Ala Gln Thr Pro Leu Glu Thr Gln Met Lys Val Ile Ile Trp Gln Thr  
                   785                  790                  795                  800  
 Ser Leu His Ile Pro Pro Gln Ala Lys Leu Ser Pro Glu Ala Ser Asp  
                   805                  810                  815  
 Leu Ile Ile Lys Leu Cys Arg Gly Pro Glu Asp Arg Leu Gly Lys Asn  
                   820                  825                  830  
 Gly Ala Asp Glu Ile Lys Ala His Pro Phe Phe Lys Thr Ile Asp Phe  
                   835                  840                  845  
 Ser Ser Asp Leu Arg Gln Gln Ser Ala Ser Tyr Ile Pro Lys Ile Thr  
                   850                  855                  860  
 His Pro Thr Asp Thr Ser Asn Phe Asp Pro Val Asp Pro Asp Lys Leu  
                   865                  870                  875                  880  
 Trp Ser Asp Gly Ser Glu Glu Glu Asn Ile Ser Asp Thr Leu Ser Gly  
                   885                  890                  895  
 Trp Tyr Lys Asn Gly Lys His Pro Glu His Ala Phe Tyr Glu Phe Thr  
                   900                  905                  910  
 Phe Arg Arg Phe Phe Asp Asp Asn Gly Tyr Pro Tyr Asn Tyr Pro Lys  
                   915                  920                  925  
 Pro Ile Glu Tyr Glu Tyr Ile His Ser Gln Gly Ser Glu Gln Gln Ser  
                   930                  935                  940  
 Asp Glu Asp Asp Gln His Thr Ser Ser Asp Gly Asn Asn Arg Asp Leu  
                   945                  950                  955                  960  
 Val Tyr Val